



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/737,273

12/16/2003

Takashi Miyoshi

17318

6182

23389 7590 06/08/2007
SCULLY SCOTT MURPHY & PRESSER, PC
400 GARDEN CITY PLAZA
SUITE 300
GARDEN CITY, NY 11530

EXAMINER

NEGRON, WANDA M

ART UNIT

PAPER NUMBER

2622

MAIL DATE

DELIVERY MODE

06/08/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/737,273

Applicant(s)

MIYOSHI ET AL.

Examiner

Wanda M. Negrón

Art Unit

2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. The disclosure is objected to because of the following informalities:
 - The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
 - The phraseology "to determine a predetermined exposure level" found on lines 7-8 of the abstract and throughout the specification is unclear, particularly because it is considered to be contradictory. According to applicant's disclosure, a first exposure level is determined, i.e. "a predetermined exposure level is set", based only on the scene's ambient light (see specification, page 18, lines 19-20). Said first exposure level is used to determine a second exposure level, i.e. a "proper exposure level" (see specification, page 18, lines 24-26). Since said first exposure level could only be considered "a predetermined exposure level" *after* being set, the examiner suggests, for clarification purposes, the use of alternative wording such as "to determine a first exposure level".
 - On page 16, line 4, the word *needless* is misspelled as "needles".

- The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Appropriate correction is required.

DETAILED ACTION

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

5. **Claims 1 and 11-15** are drawn, *inter alia*, to an apparatus or a method "to determine a predetermined exposure level". This phraseology is unclear, particularly because it is considered to be contradictory, as mentioned in the above discussion of the objections to the disclosure.

For examination purposes, the phrase "to determine a predetermined exposure level" or "determining a predetermined exposure level" is interpreted as "to determine a first exposure level" or "determining a first exposure level", and has been treated as such for the remainder of this Office action.

Any claim not specifically addressed above, is being rejected as incorporating the deficiencies of a claim upon which it depends.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. It has been held that the recitation that an element is "capable of" performing a function, as stated in **claims 1, 3, and 11-15**, is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138.

Even if such recitations were considered positive limitations, which the examiner does not concede, they are disclosed by Uomori et al. as detailed below.

8. **Claims 1, 4-9 and 11-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Uomori et al. (US Patent No. 6,876,392 B1).**

9. Regarding **claims 1 and 14**, Uomori et al. disclose an image pickup apparatus, i.e. an image-capturing rangefinder (see col. 10, lines 51-58), capable of performing an

image pickup with pattern projection on an object to obtain three-dimensional information on the object, and an image pickup without pattern projection (see col. 11, lines 6-16), comprising: an exposure level determination section (exposure controller 301) configured to determine a first exposure level needed by an image pickup device of the image pickup apparatus, i.e. a background light LB reading (see col. 11, lines 37-42); and a shutter speed determination section (exposure controller 301; see col. 11, lines 45-50; col. 12, lines 20-25) configured to determine a first shutter speed to achieve the first exposure level determined by the exposure level determination section in the image pickup without pattern projection, i.e. selecting a shutter speed to obtain exposure level L2 (see col. 11, lines 37-42), and a second shutter speed not slower than the first shutter speed, i.e. selecting a shutter speed to obtain exposure level L1 (see col. 11, lines 37-42), wherein the image pickup with pattern projection is conducted by use of the second shutter speed.

10. Regarding **claim 4**, Uomori et al. disclose that the pattern is projected by use of light emitted from a flash emission source (light source section 10).

11. Regarding **claim 5**, Uomori et al. disclose that the shutter speed determination section determines the second shutter speed so as to take a time longer than a time in which the pattern is projected (see col. 11, lines 51-54).

12. Regarding **claim 6**, Uomori et al. disclose an image pickup aperture adjustment section (exposure controller 301; see col. 11, lines 45-50) configured to adjust an image pickup aperture (diaphragm 313), wherein the image pickup aperture adjustment section adjusts the image pickup aperture to have the first exposure level at the second

shutter speed, i.e. a signal level LB is within the dynamic range of the imager (see figure 8(a)) during three-dimensional image capture.

13. Regarding **claim 7**, Uomori et al. disclose that the shutter speed determination section determines at least one of the second shutter speed and the image pickup aperture (diaphragm 313), of the image pickup apparatus on the basis of luminance information on the object when the pattern is projected, i.e. signal level LA, and of the first exposure level, i.e. a signal level LB (see figures 8(a)-8(b), col. 11, lines 37-42).

14. Regarding **claim 8**, it would have been inherent to select the first shutter speed on the basis of an image pickup aperture (diaphragm 313), which provides a desired field depth, and of the first exposure level, i.e. background signal level LB, in order to obtain a proper exposure level with the intended depth of field.

15. Regarding **claim 9**, it would have been inherent to select an image pickup aperture not smaller than an aperture that can achieve the first exposure level in the image pickup with pattern projection, i.e. the diaphragm is set to ensure that the background light level LB is within the dynamic range of the imager (see figure 8(a)) during three-dimensional image capture, when the shutter speed of the image pickup apparatus takes the same time as a projection time of the pattern (see long-time exposure in figure 4).

16. Regarding **claims 11 and 15**, Uomori et al. disclose an image pickup apparatus, i.e. an image-capturing rangefinder (see col. 10, lines 51-58) comprising: an image pickup section (camera section 310), including an image pickup device (CCD imager 314), configured to pick up an image of an object; a projection section () light source

Art Unit: 2622

section 10) configured to project a pattern on the object during the image pickup (see figure 3, col. 12, lines 24-25), the image pickup apparatus being capable of performing an image pickup by the image pickup section with pattern projection by the projection section on the object to obtain three-dimensional information on the object, and an image pickup by the image pickup section without pattern projection (see col. 11, lines 12-16); an exposure level determination section (exposure controller 301) configured to determine a first exposure level needed by an image pickup device of the image pickup apparatus, i.e. a background light LB reading (see col. 11, lines 37-42); and a shutter speed determination section (exposure controller 301; see col. 11, lines 45-50; col. 12, lines 20-25) configured to determine a first shutter speed to achieve the first exposure level determined by the exposure level determination section in the image pickup without pattern projection, i.e. selecting a shutter speed to obtain exposure level L2 (see col. 11, lines 37-42), and a second shutter speed not slower than the first shutter speed, i.e. selecting a shutter speed to obtain exposure level L1 (see col. 11, lines 37-42), wherein the image pickup with pattern projection is conducted by use of the second shutter speed. It would have been inherent to have a photometric section configured to measure luminance information on the object in order to properly set the camera exposure conditions, i.e. shutter speed, diaphragm stop, etc.

17. Method **claims 12 and 13** are drawn to the method of using the corresponding apparatus claimed in claim 1. Therefore method claims 12 and 13 correspond to apparatus claim 1 and are rejected for the same reasons of anticipation (obviousness) as used above.

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. **Claims 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uomori et al. (US Patent No. 6,876,392 B1).**

20. Regarding **claim 2**, as mentioned in the discussion of claim 1 above, Uomori et al. disclose all the limitations of the parent claim. Uomori et al., however, do not explicitly teach that the second shutter speed, i.e. the shutter speed for capturing a three-dimensional image using a light pattern projection, is a shutter speed faster than the first shutter speed, i.e. the shutter speed for capturing a two-dimensional image without using the light pattern projection.

On the other hand, Uomori et al. disclose that the exposure level can be controlled by the shutter speed (see col. 9, lines 41-46, col. 12, lines 20-25), which would reasonably suggest that other image-capturing settings, e.g. aperture and sensitivity of the imager, remain constant. Official notice is taken that it is well known in the art that controlling the exposure level by selecting the proper shutter speed when all other settings are kept constant entails having a faster shutter speed when using a light source than when the light source is not in use in order to prevent pixel saturation.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the second shutter speed be faster than the first shutter speed in order to prevent pixel saturation due to the light pattern projection.

21. Regarding **claim 10**, as mentioned in the discussion of claim 1 above, Uomori et al. disclose all the limitations of the parent claim. Uomori et al., however, do not explicitly teach an illumination section configured to illuminate the object during the image pickup, wherein the image pickup apparatus picks up an image of the object illuminated by the illumination section by use of a shutter speed not slower than the second shutter speed. In other words, Uomori fails to disclose using a light source when performing the two-dimensional image capture.

Official notice is taken that the concept and the advantage of using a strobe light when ambient light is not sufficient to illuminate an object is well known in the art.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a strobe light when ambient light is not sufficient to illuminate an object in order to obtain the proper exposure level.

22. **Claims 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uomori et al. (US Patent No. 6,876,392 B1), and further in view of Iwaki (JP Application Publication No. 2002-170100).**

23. Regarding **claim 3**, as mentioned in the discussion of claim 1 above, Uomori et al. disclose of the parent claim. Uomori et al., however, do not explicitly disclose that the image pickup apparatus is a stereographic image pickup apparatus capable of

picking up images of the object from a plurality of view points, and the pattern is a random dot pattern.

The concept and the advantage of using a multiple viewpoint image-capturing apparatus, e.g. a stereographic camera, for three-dimensional image reconstruction is well-known in the art. For such purposes, Iwaki discloses a stereographic image pickup apparatus capable of picking up images of the object from a plurality of viewpoints (see figure 1, paragraph [0011], lines 4-6), and the use of a random dot pattern for three-dimensional image capture (see paragraph [0035]).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a stereographic image pickup with a random dot projection pattern in order to obtain a better three-dimensional image by using exact corresponding points between the stereographic viewpoints when performing three-dimensional image reconstruction (see Iwaki, paragraph [0001]).

Conclusion

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Iwaki (US Application Publication No. 2002/0134839 A1) discloses, *inter alia*, an image capturing device for capturing a three-dimensional image of a subject by projecting a pattern on said subject and by capturing images from different viewpoints.

- Kitaguchi et al. (US Application Publication No. 2002/0113946 A1) disclose an image input apparatus comprising a projector for projecting a predetermined pattern onto an image object, and an image pick-up unit for capturing a plurality of projection images at different pick-up locations, i.e. viewpoints.
- Seo (US Application Publication No. 2002/0186976 A1) discloses an image-capturing device that captures a two-dimensional and a three-dimensional image of a subject using the same optical system at appropriate exposures.

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wanda M. Negrón whose telephone number is (571) 270-1129. The examiner can normally be reached on Mon-Fri 6:30 am - 4:00 pm alternate Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Wanda M. Negrón/

Examiner, Art Unit 2622
May 22, 2007



DAVID OMETZ
SUPERVISORY PATENT EXAMINER